Brief Introduction to Middleware Architecture

CAS 747: Software Architecture Modeling and Analysis

Instructor

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March 21, 2006

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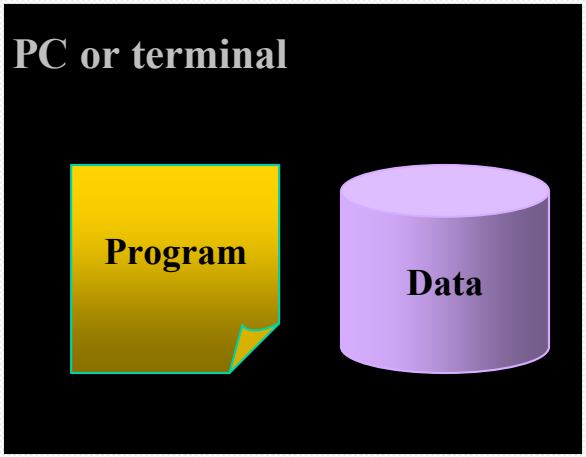
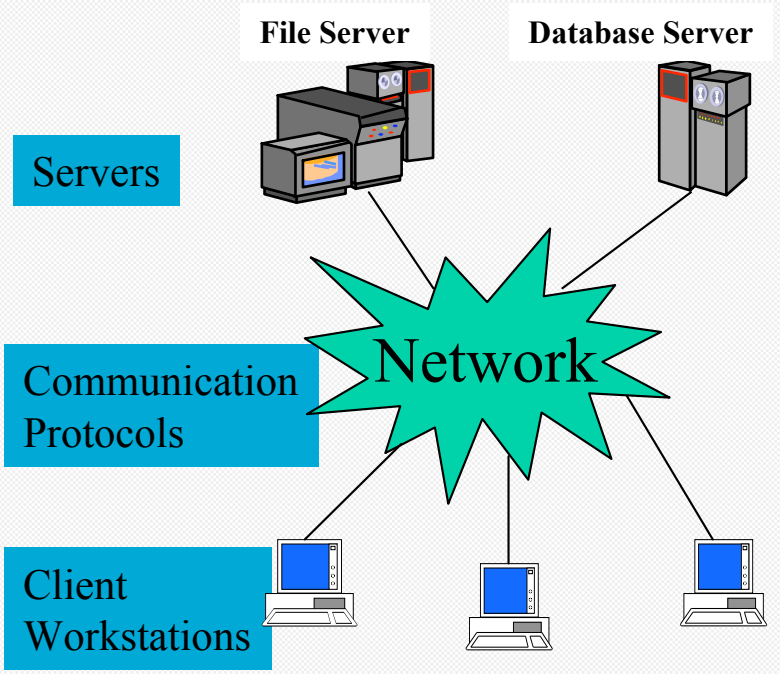
Enterprise Architecture Evolution

- Monolithic Applications (1-tier)
  - Called mainframe
  - Business logic and Representational logic in the same machine
  - Data can't be shared



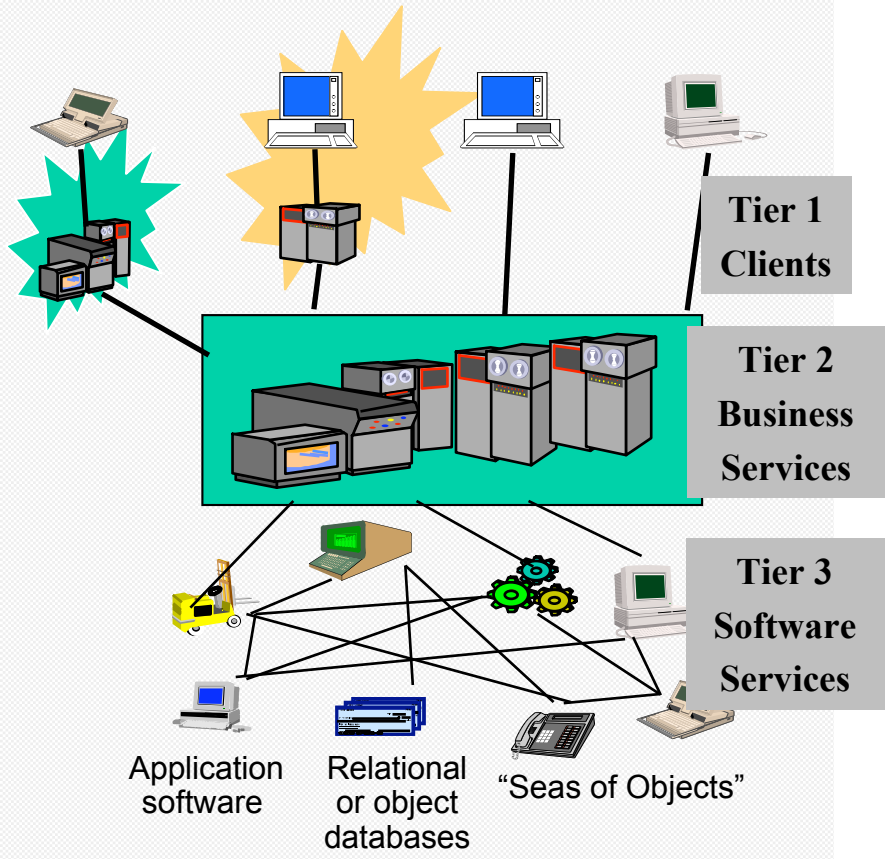
Enterprise Architecture Evolution

- Client/Server Applications (2-tier)
  - Server implements some business logic
  - Client implements the representation logic and some business logic



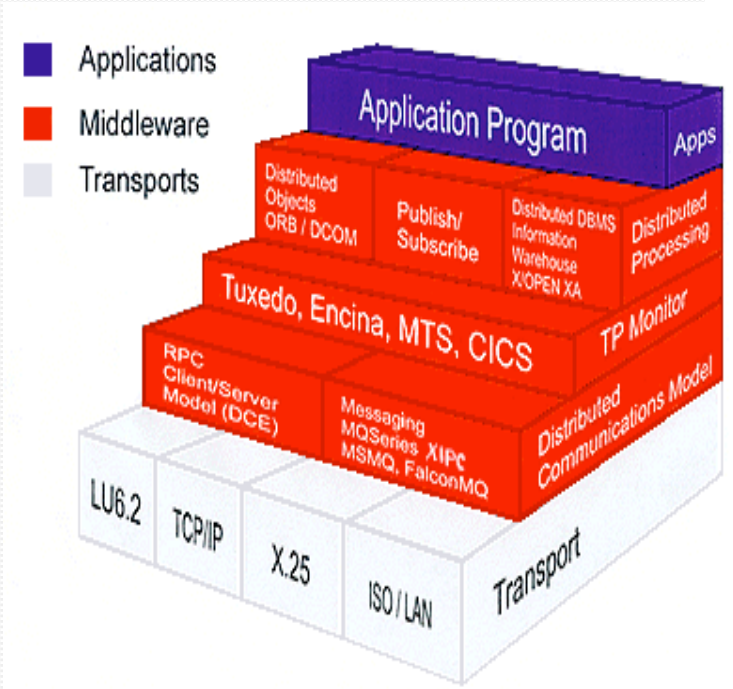
Enterprise Architecture

- Distributed Application
  - Client implements the represent logic
  - Middleware provides the business services: Naming service, Transaction service
  - Backend software processes the middleware request



What is Middleware?

- A region in between client and server
- Provides an isolation layer, dealing with the different protocols and interfaces from heterogeneous environment
- Presents its own API



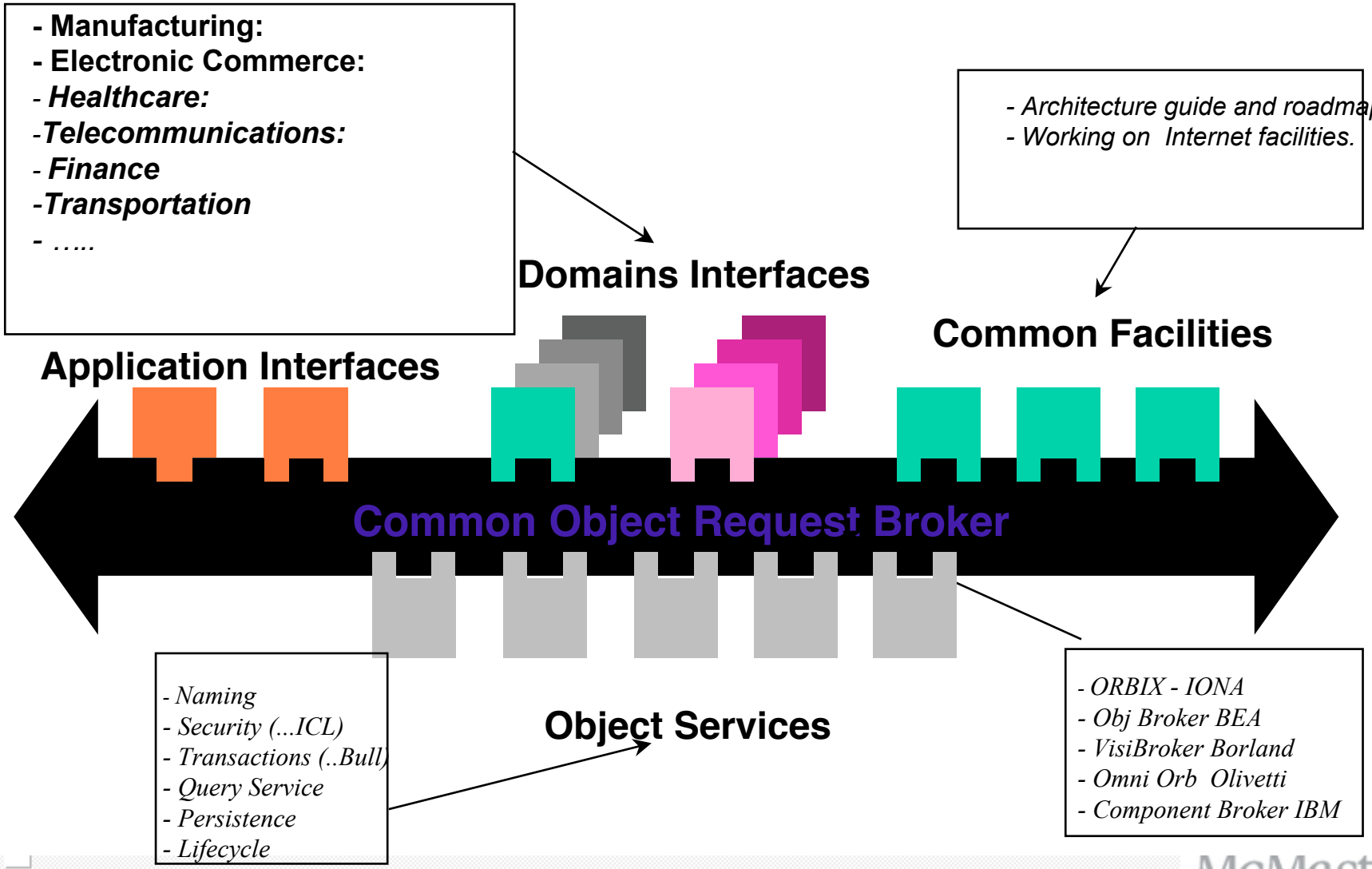
Major Middleware Technologies

- Distributed Computing Environment (DCE), from the Open Software Foundation
- Remote Method Invocation (RMI), from Sun
- Common Object Request Architecture (CORBA), from OMG
- Distributed Common Object Model (DCOM), from Microsoft
- Common Object Model Plus (COM+), from Microsoft

Common object Request Architecture (CORBA)

- A specification for distributed objects from OMG.
- Platform independence
- Language independence
- Vendor independence

CORBA Architecture



CORBA-IDL

- A neutral definition language to describe the interface of an object
- Supports multiple-inheritance, strongly typed, public interface specification language
- Mapping to many languages, Java, C++, C, smalltalk, Cobol
- Isolates interface from implementation
- Enables interoperability

Internet Inter-ORB Protocol (IIOP)

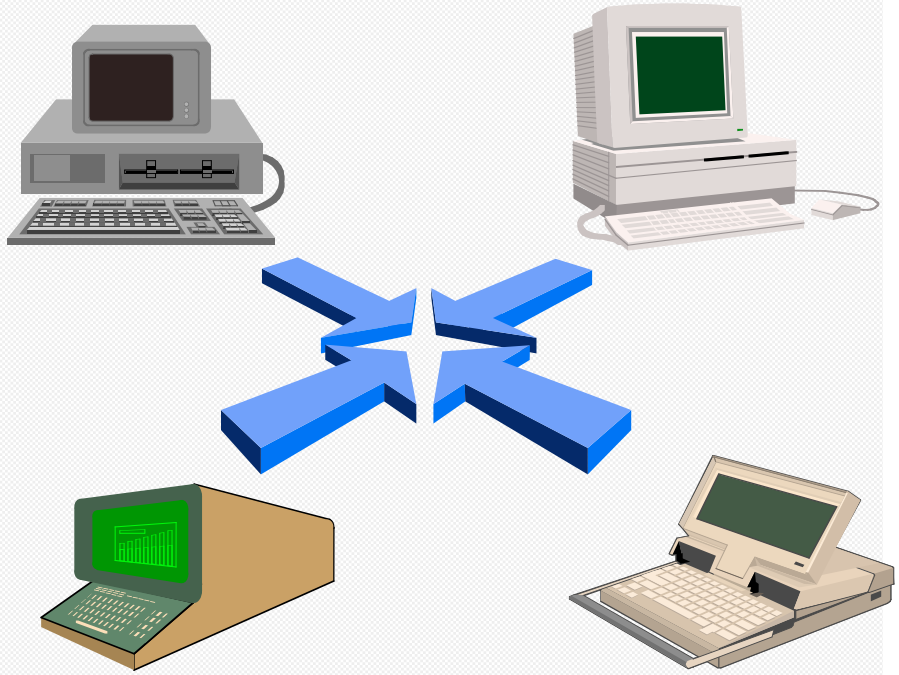
- A common protocol for different ORBs
- Platform independence
- An ideal solution for the Internet
- Integrated with other technologies

Enterprise Java Beans (EJB)

- Server-side component model for Java
- Frees the EJB developer to concentrate on business logic programming
- Handlers the codes required by the distributed application development scenario

Problem: Network Centric Computation

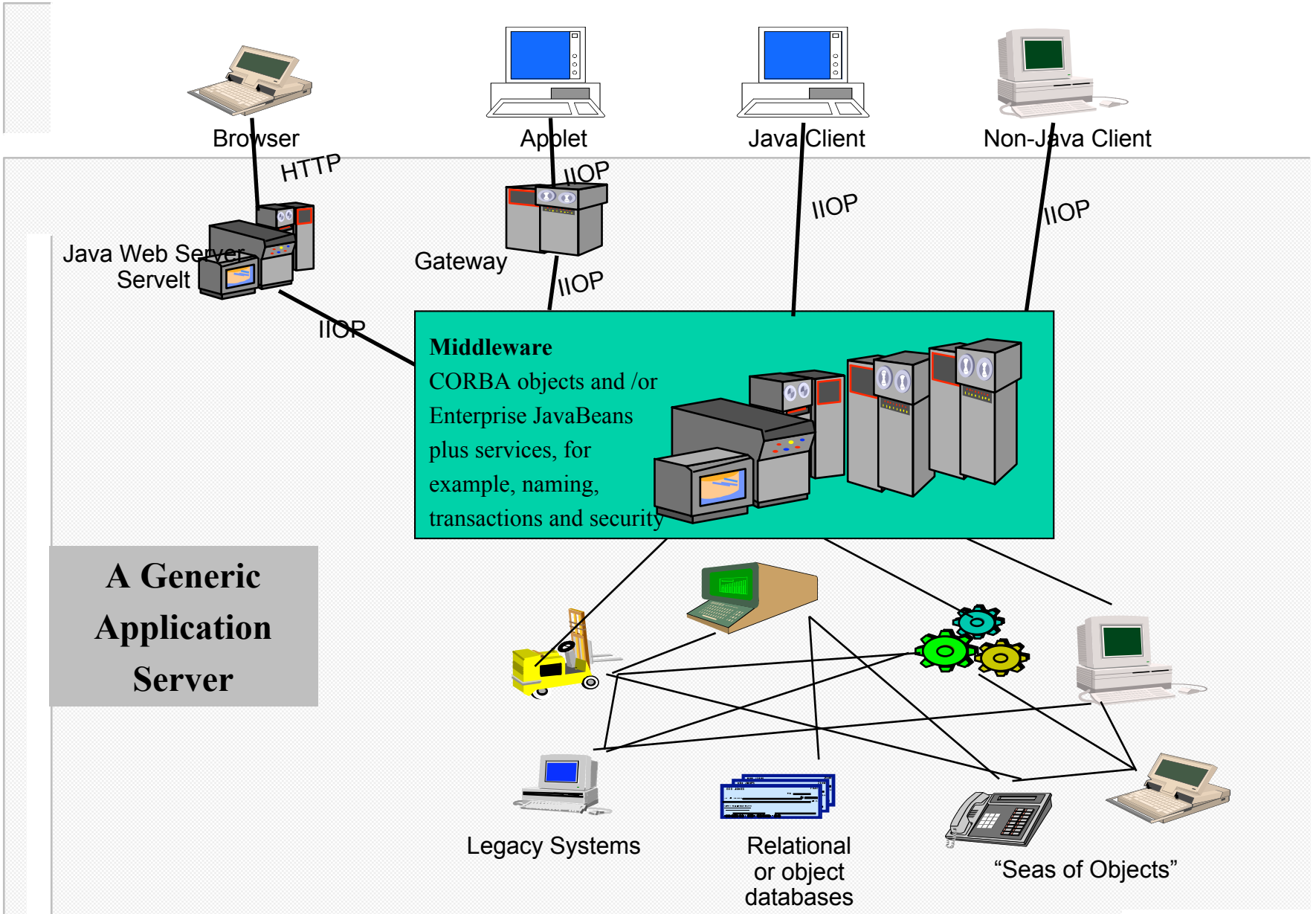
- Integration of heterogeneous sources:
  - operating systems
  - program language
  - network protocol
  - data representation



- Internet Accessibility of Services
  - requires web sites provide transactional services, security, messaging, naming services

Implementation

- Combination of CORBA and EJB to address the problems
  - CORBA provides an object-based middleware spanning over heterogeneous platforms, provides transaction services
  - EJB is a Java-based component-oriented framework for developing, deploying, and managing distributed, transactional applications


Browser
Applet
Java Client
Non-Java Client
HTTP
IIOP
IIOP
IIOP
IIOP
Java Web Server
Servelt
Gateway
Middleware
CORBA objects and /or
Enterprise JavaBeans
plus services, for
example, naming,
transactions and security
A Generic
Application
Server
Legacy Systems
Relational
or object
databases
"Seas of Objects"

References

- Network Centric Computing & Software Reengineering: by K. Kontogiannis, Y. Zou, P. Patil. ECE dept., University of Waterloo.
- OMG (http://www.omg.org/)

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